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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/763,734	01/23/2004	Robert J. Burnett	P1938US00	7329

24333 7590 12/20/2006
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EXAMINER

PATEL, HETUL B

ART UNIT PAPER NUMBER

2186

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/20/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/763,734	BURNETT ET AL.	
	Examiner	Art Unit	
	Hetul Patel	2186	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 29, 2006 has been entered and carefully considered. Claims 1, 3, 8-9, 11, 13, 15 and 17 are amended and claim 21 is newly added. Therefore, claims 1-21 are currently pending in the application.
2. Applicant's arguments filed on November 29, 2006 have been considered but they are not deemed to be persuasive.
3. The rejection of claims 1-19 as in the Office Action mailed on August 23, 2006 is respectfully maintained but updated to show the changes made by the amendment; and reiterated below for Applicant's convenience.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-7, 11, 13-16 and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Oh (USPN: 2005/0050292).

As per claim 1, Oh teaches a method of creating a virtual disk storage (i.e. the extra layer of storage in the memory hierarchy between the main memory and the hard disk) construct using disk storage consolidated from at least two grid computers (i.e. from multiple exporters) of a computing grid utilizing a connecting network (i.e. via network as shown in Fig. 2), comprising: locating an unused portion of a total disk storage space on at least one disk drive of each grid computer of the at least two grid computers (i.e. partition from at least two exporters) connected by the connecting network (i.e. via network as shown in Fig. 2) of the computing grid; and presenting, on at least one computer (i.e. the importer), a portion of the unused portion (i.e. the unused memory partitions; see paragraph [0020]) of the total disk storage space of each of the at least two grid computers as a single combined virtual storage drive (i.e. the aggregated remote memory having the additional layer made of the plurality of the remote memory partitions) (e.g. see paragraphs [0020], [0023] and [0025] and Fig. 2).

As per claim 2, Oh teaches the claimed invention as described above and furthermore, Oh teaches that the method including allocating a portion of the total disk storage space on each of the at least two grid computers (i.e. the unused memory partition of the other/remote computers) to be made available as part of the virtual storage drive (e.g. see paragraph [0020]).

As per claim 3, Oh teaches the claimed invention as described above and furthermore, Oh teaches that only the unused memory partitions are assigned/contributed to the other/remote computers/grids (e.g. see paragraph [0020]). Therefore, at least a portion (i.e. the used memory partition) of predetermined size (i.e. the size of the used portion) of the total disk storage space are inherently reserved for local use on each of the at least two grid computers. According to the Oh prior art, the unused memory is available for contribution to other computers (i.e. for the virtual storage drive). In other words, the used portion of the memory is not available for the other grid computers, i.e. it is reserved for the local use and the inclusion of it in the single virtual storage is avoided as claimed in claim 20. Accordingly, claim 20 is also rejected.

As per claim 4, see arguments with respect to the rejections of claims 2 and 3. Claim 4 is also rejected based on the same rationale as the rejection of claims 2 and 3.

As per claim 5, Oh teaches the claimed invention as described above and furthermore, Oh teaches that when a remote computer/grid needs more memory, it can request for it over the network and the remote computer(s)/grid(s) allows to use their unused memory partitions. These remote memory partitions are returned to the original owner when no longer needed by the requesting computer/grid (e.g. see paragraphs [0020]-[0022]). Since the remote memory partitions are returned to the owner grids when they no longer needed, there has to be a table, of grid computers contributing storage space to the virtual storage drive and corresponding amounts of storage space made available by each contributing grid computers, present in the method taught by

Oh. Therefore, the feature of having this table is inherently embedded in the method taught by Oh.

As per claims 6 and 7, Oh teaches the claimed invention as described above and furthermore, Oh teaches that the first and second computers are connected via a network; creating a file in the storage memory of the first computer and *allocating* additional blocks of the storage memory of the second computer (e.g. see paragraph [0008]). Since Oh teaches that the allocation of additional blocks from the second computer to the first computer based on needs of the first computer, the steps of (i) monitoring at least one of the grid computers (i.e. the first computer) for activity indicating that additional disk storage space (i.e. the additional blocks) has been added to the at least one grid computer; and (ii) allocating disk storage space on the at least one grid computer (i.e. the first computer) after detecting activity indicating that additional storage space has been added to the at least one grid computer, are inherently present in the method taught by Oh.

As per claims 13-16, see arguments with respect to the rejection of claims 1-3 and 6, respectively. Claims 13-16 and 18-19 are also rejected based on the same rationale as the rejection of claims 1-3 and 6, respectively.

As per claim 11, Oh teaches the claimed invention as described above and furthermore, Oh teaches that the method additionally including loading an agent application (inherent) on each of the grid computers (i.e. multiple exporters) for managing the portion of the unused portion of the total disk storage space on the grid computer made available to the virtual storage drive, i.e. the agent application which is

inherently embedded in the Oh's method, allocates the remote memory partitions to the requesting computers/grids which requires the memory space and it also returns these remote memory partitions to the original owner when no longer needed by the requesting computer/grid (e.g. see paragraphs [0020]-[0022]).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 8-9 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oh in view of Ebata et al. (USPN: 2004/0044698) hereinafter, Ebata.

As per claims 8 and 9, Oh teaches the claimed invention as described above. However, Oh failed to teach the further limitations of (i) monitoring at least one of the grid computers for activity indicating that a predetermined minimum amount of free disk storage space of the total disk storage space on the grid computer has not been maintained; wherein the predetermined minimum amount of free disk storage space is set using an agent application on the at least one grid computer; and (ii) allocating disk storage space on the at least one grid computer for use by local applications after detecting activity indicating that the minimum amount of free disk storage space has not been maintained to restore at least the minimum amount of free disk storage space.

Ebata, on the other hand, teaches a method for moving files between storages across the network to rebalance the free disk space across the network.

Ebata, on the other hand, teaches the method includes the step of monitoring at least one of the grid computers (i.e. at least one of the storage across the network) for activity indicating that a predetermined minimum amount (i.e. the threshold value) of free disk storage space of the total disk storage space on the grid computer has not been maintained (i.e. there is imbalance in available and minimum free disk space), wherein the predetermined minimum amount of free disk storage space is set using an agent application (i.e. an instruction from an administrator) on the at least one grid computer (i.e. the threshold value is set in the configuration information module (i.e. 180 in Fig. 1) of at least one grid computer (i.e. 8 in Fig. 1) (e.g. see paragraph [0045]); and (ii) allocating disk storage space on the at least one grid computer for use by local applications after detecting activity indicating that the minimum amount of free disk storage space has not been maintained to restore at least the minimum amount of free disk storage space (e.g. see the abstract). Accordingly, it would have been obvious to one ordinary skilled in the art at the time of the current invention was made to implement the steps taught by Ebata in the method taught by Oh. In doing so, (i) a steady imbalance of the free disk spaces among the network storages is prevented so that clients can always use the system and even if client writes large files and a maximum quantity of data can be written to disks managed by the virtualized network storage system; and (ii) during file migration between network storages, access

requests from clients are not stopped while a file is being moved between network storages (e.g. see paragraphs [0015]-[0016]).

As per claim 17, see arguments with respect to the rejection of claim 8. Claim 17 is also rejected based on the same rationale as the rejection of claim 8.

6. Claims 10 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oh in view of Wells et al. (USPN: 5,416,782) hereinafter, Wells.

As per claim 10, Oh teaches the claimed invention as described above, but failed to teach that the method additionally including providing a safe area on disk storage space of the virtual storage drive, the safe area being kept free of data. Wells, however, teaches about keeping a portion of the memory space free of data to allow the cleanup operation (e.g. see Col. 5, lines 1-6). Accordingly, it would have been obvious to one ordinary skilled in the art at the time of the current invention was made to implement the step taught by Wells in Oh's method. In doing so, data can be temporarily stored at this safe area when (i) data needs to be transferred within the memory space; and (ii) the cleanup operation is required to run.

As per claim 18, see arguments with respect to the rejection of claim 10. Claim 18 is also rejected based on the same rationale as the rejection of claim 10.

7. Claims 12 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oh in view of Watkins et al. (USPN: 2002/0015336) hereinafter, Watkins.

As per claim 12, Oh teaches the claimed invention as described above, but does not teach the step of backing up data by copying data from a reserved portion of the disk storage space to the virtual storage drive. Watkins, however, discloses a step of copying data from a reserved portion (i.e. the second data storage areas, 509-511 in Fig. 5) of the disk storage space (i.e. 200-202 in Fig. 2) of at least one of the grid computers (i.e. 100-102 in Fig. 1) to an available portion of at least two other grid computers of the computing grid that have been made available to the virtual storage drive (i.e. the first data storage areas, 203-205 in Figs. 2 and 5) to thereby backup the copied data from the reserved portion of the at least one grid computer (e.g. see the abstract and Figs. 1-2 and 5). Accordingly, it would have been obvious to one ordinary skilled in the art at the time of the current invention was made to implement the teachings of Watkins in the method taught by Oh so in the event of failure of any one of the data storage devices, data can be recovered from the second data storage areas of the other data storage devices.

As per claim 19, see arguments with respect to the rejection of claim 12. Claim 19 is also rejected based on the same rationale as the rejection of claim 12.

Allowable Subject Matter

8. Claim 21 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Remarks

9. As to the remark, Applicant asserted that

- (a) It is submitted that one of ordinary skill in the art would not be led to
“*presenting a portion of the total disk storage space of each of the at least two
grid computers as a single virtual storage drive on at least one computer*”.
- (b) Nothing in the Oh prior art states or suggests that there is any reservation of
any space on the computers, and to the contrary there is only discussion of
“contribut[ing] their unused memory partitions to other computers”.
- (c) Claim 4 requires “determining ... and allocating the total disk storage space
between a portion made available for use as part of the virtual storage drive
and a portion reserved for local use on the grid computer”. Oh patent simply
does not disclose this feature of the invention.

Examiner respectfully traverses Applicant's remark for the following reasons:

With respect to (a), the Oh prior art does teach a single virtual storage drive (i.e. the exported memory partition) as described in paragraph [0025]. Furthermore, Oh prior art teaches clearly teaches the exported memory partition becomes a new layer (i.e. a single virtual storage drive). Just for sake of argument, even if Examiner agree with Applicant's interpretation, i.e. the Oh prior art teaches about creating a new layer for each exported memory partition, the Oh prior art still reads on the pending claims because claim 1 can also be interpreted as following: the limitation “locating an unused portion ... of computing grid” means locating an unused portion of the total disk space

on disk drives of each of the two grid computers; and the limitation “presenting a portion of the total disk ... on at least one computer” means presenting a portion of the total disk space of each of the two grid computers as a single virtual storage drive, i.e. a single virtual storage drive is created for each of the two grid computers using a portion of the total disk space of each of the two grid computers.

With respect to (b), Oh teaches that only the unused memory partitions are assigned/contributed to the other/remote computers/grids (e.g. see paragraph [0020]). Therefore, at least a portion (i.e. the used memory partition) of predetermined size (i.e. the size of the used portion) of the total disk storage space are inherently reserved for local use on each of the at least two grid computers. According to the Oh prior art, the unused memory is available for contribution to other computers (i.e. for the virtual storage drive). In other words, the used portion of the memory is not available for the other grid computers, i.e. it is reserved for the local use and the inclusion of it in the single virtual storage is avoided.

With respect to (c), as described above in the rejection of claims 2 and 3, Oh teaches about allocating a portion of the total disk storage space on each of the at least two grid computers (i.e. the unused memory partition of the other/remote computers) to be made available as part of the virtual storage drive (e.g. see paragraph [0020]). Therefore, at least a portion (i.e. the used memory partition) of predetermined size (i.e. the size of the used portion) of the total disk storage space are inherently reserved for local use on each of the at least two grid computers, as claimed in claim 4.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hetul Patel whose telephone number is 571-272-4184. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on 571-272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

H.B. Patel 12/06/2006
Hetul Patel
Patent Examiner
Art Unit 2186